

# ATOMIC ENERGY

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Dear Sir:

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Expansion of the United States atomic energy program to a \$6 billion yearly spending rate, from its present \$1 billion rate, was proposed last week in Washington by Senator Brien McMahon, chairman, Joint Congressional Committee on Atomic Energy. This sharp upward revision in atomic spending would be for the purpose of increasing the production rate of atomic weapons, so that they could be the backbone of the defense of the U.S., according to McMahon's suggestions which were in the form of a resolution he introduced into Congress. He asserted that by concentrating on atomic weapons, to the exclusion of conventional armaments, the present \$60 billion military budget of the United States could be cut in half.

McMahon cited these facts as proof that the United States is now at a stage where low-cost atomic weapon production is feasible: (1) That an atomic weapon could now produce, "at a cost of \$20 to \$30, the same explosive force which costs literally thousands of dollars to produce by ordinary means--bazooka, depth charges, etc". (2) That within three years the production rate of atomic bombs would be in the "tens of thousands". (3) That the atomic bomb no longer had to be "jealously hoarded" and with the expansion he proposed it would be possible to revolutionize military fire power.

(This McMahon resolution, in the opinion of Washington observers, was a "feeler" designed to obtain reaction to a large budget increase contemplated by the U. S. Atomic Energy Commission. As has been pointed out in previous issues of this NEWS-LETTER (V.6, N.1), the Joint Committee has now virtually usurped control of atomic energy, away from the U. S. Atomic Energy Commission.)

Confirming Senator McMahon's assertions that the U. S. has developed tactical atomic weapons for use against troops in the field was the announcement from the Department of Defense in Washington last week that some 5,000 combat troops would take part in the forthcoming new series of atomic test explosions near Las Vegas, Nev. In these tests, a whole "family" of atomic bombs, designed for different military purposes, will be used. Called exercise "Desert Rock", a major objective will be to determine how soon troops can drive forward into radioactive contaminated areas to take advantage of the effect upon the enemy of nuclear blasts....Meanwhile, Admiral McCormick, Commander-in-Chief, Atlantic Fleet, stated in New York last week that "since the reduction in size of atomic bombs they have become more generally available for carrier use". He referred to the new light-weight atomic bombs, which can be carried by the three man AJ-type planes that operate from aircraft carrier decks. Some have already been so lifted.

Additional funds for the USAEC's hydrogen bomb materials plant in South Carolina were requested from Congress last week by President Truman. He asked \$484,240,000.00 (as supplementary to the regular USAEC budget) in addition to the \$695,760,000.00 already made available for this project. The request stated that the original lower estimate had been made before selection of the site and determination of the scope of the project.

BUSINESS BRIEFS...from nuclear energy enterprises....

Contract Awards- A recapitulation of contract awards made by E. I. du Pont de Nemours (prime contractor at the USAEC's new hydrogen bomb materials plant in South Carolina) shows that for the first 6-months of this year 10,376 awards were made. Of that amount, 7,675 went to "small business" firms (those employing less than 500 persons). The 10,376 contract awards totaled \$124,325,242.00. The 7675 awards amounted to \$32,233,666.00, or 26% of the total.

New Uranium Mining- The Securities and Exchange Commission has accepted registration of 384,000 shares of South State Uranium Mines, Ltd., of Toronto, Canada, and Longview, Texas. Two Texas directors (of the three principals of the company; the third is a Toronto man) said the registration would permit the company to go ahead with the financing of exploration on property held 106 miles north of Montreal.

Expediting Materials - A new super priority was announced last week by the National Production Administration, in an effort to channel critical goods to programs of the U. S. Atomic Energy Commission, and the Department of Defense. The new rating, to be known as "DX", overrides all others in the procurement of metals other than steel, copper, and aluminum, which are covered by the Controlled Materials Plan. Production authority executives said in Washington that the new rating was an emergency device, which can only be issued by the Defense Agency's unit in Washington, or by orders signed directly by the Secretary of Defense or the chairman of the USAEC.

For Prospective USAEC (Classified) Bidders- A booklet explaining how prospective bidders or contractors can be cleared to handle confidential or secret information has now been issued by the Defense Department's Munitions Board. Titled "How to be Cleared for Handling Classified Military Information Within Industry", the booklet is available from the Superintendent of Documents, Wash. 25, D.C.

BOOKS & OTHER PUBLICATIONS...in the nuclear field...

Domestic Control of Atomic Energy, by R. A. Dahl and R. S. Brown. Some of the aspects of the "nationalized" atomic energy program in the United States. 117 pages. --Social Science Research Council, 230 Park Ave., New York 17 (\$1.00).

Atomic Energy for the Layman, by Sir Arthur L. Dixon. A simplified explanation. 221 pages.--Chantry Publications, Ltd., London (England.) (8s. 6d.)

Applied Atomic Energy, by K. Fearnside, E. W. Jones, and E. N. Shaw. Latest developments in the peaceful applications of atomic energy. The use of radioactive and other isotopes in industrial, agricultural, and medical research; radiography; pure research and biological work. Also: problems of international control, and the prospects of useful power generation.--Temple Press, Ltd., London, E.C. 1 (England) (8s. 9d.)

Is Your Plant a Target? Recommendations for industrial dispersion as defense against atomic weapons. 16 pages.--Superintendent of Documents, Washington 25, D.C. (25¢)

Civil Defense: National Security and Legislation, by Murray S. Levine. A critical analysis of civil defense in the United States. 26 pages. -- New York Committee on Atomic Information, Inc., 39 Broadway, New York 6. (\$1.00)

Notes: A supplement to its general catalogue has now been issued by Atomic Instrument Co., Cambridge 39, Mass. Several of the newest instruments of the company are described in this supplement.

The 12th Annual Report of Arizona's Department of Mineral Resources carries an account of the uranium, beryllium, etc., mined in that state. A copy may be obtained from R.I.C. Manning, chief engineer of the department, Mineral Building, Fairgrounds, Phoenix, Ariz.

Various reports (Detection of slow neutrons; Iridium-192 for gamma ray radiography; etc.) from the nuclear energy research establishments of Great Britain and Canada, and which are now generally available, are listed in the Sept. 14th, 1951 "Bibliography of Technical Reports", of the Office of Technical Services, Washington 25, D.C. Inquiries should be made to John C. Green, director.

In the Nuclear Science Field at the American Chemical Society meeting in New York, Sept. 3-7, 1951; some papers of interest:

ANALYTICAL CHEMISTRY- In the symposium on nucleonics and tracer techniques in analytical chemistry, some principles and methods used in radiochemical analysis were outlined in a paper by David N. Hume, MIT. Dr. Hume described four main categories: direct measurement of the radioactivity of naturally radioactive elements; isotope dilution in which the decrease in the amount of radioactivity is related to the mass of the desired compound; identification and determination of radioactivity due to individual constituents in mixtures of radioactive materials, called activity analysis; and lastly, activation of a compound and measurement of the resulting radioactivity by radiochemical means. This is called activation analysis.

The use of activation analysis for the precise determination of microquantities of gallium, gold and rhenium was described by Harrison Brown, University of Chicago. The method consists of irradiating the material in a pile, treating to separate desired activity, counting, and comparing with a standard. The sensitivity of the method was found to vary with the cross section of the substance measured. Dr. Brown reported determination of 0.5 p.p.m. of gold in a meteorite scraping.... A similar method was reported by A. A. Smales and B. D. Pate, Atomic Energy Research Establishment, Harwell, England. They studied the presence of arsenic in sea water, human hair, nails, blood, etc., often working with but a few milligrams.

In a discussion by Martin D. Kamen, Washington University Medical School, the use of tracers in biochemical analysis was reviewed. Isotopic dilution is the method most used (he pointed out) and is being extended to the quantitative analysis of complex biochemical mixtures through the use of "derivative" methods. Attempts to indicate the ultimate accomplishments and limitations of tracer methods in biochemical analysis are precluded by the rapidity with which the use of tracers are developing in this field, he concluded.

In non-biochemical fields, there is a steady increase in the variety of instruments and applications of tracers, J. E. Hudgens, USAEC, reported. He pointed out the use of tracers for studies of analytical separations and of thermodynamic and kinetic systems may result in a considerable saving of time.

WATER, SEWAGE & SANITATION CHEMISTRY- In discussing atomic energy wastes, J. H. Hayner, USAEC, described the effectiveness of evaporation ion exchange, and co-precipitation in taking out radioactivity. Less than or more than 1 curie of radioactivity per gallon of liquid waste was described as the difference between low-level and high-level radioactive wastes.... In another paper on atomic energy wastes, C. C. Ruchhoft, U. S. Public Health Service, Environmental Health Center, and A. E. Gorman, USAEC, discussed the removal of plutonium waste by using ferric chloride and lime. Their work was done at the Los Alamos, N. M., USAEC installation.

INDUSTRIAL & ENGINEERING CHEMISTRY- Characteristics of the various radioisotopes of nickel, which are finding increasing use in specialized tracer experiments, were outlined by A. R. Brosi, Oak Ridge National Laboratory. The radioisotopes of nickel exhibit a wide variation in half-lives, Brosi stated: nickel-57 has a half-life of 36 hours, in contrast to nickel-63 with a half-life of approximately 85 years. He also cited wide differences in the energetic characteristics of the radiations. Nickel-65 was described as good for activation analysis because of its energetic radiations and short half-life. Nickel-63 emits very soft beta radiations, and Brosi predicted that this isotope will become one of the most useful.

Among papers presented in the two-session fluorine symposium, were those of J.W. Grisard, H. A. Bernhardt, and G. D. Oliver, USAEC, Oak Ridge. They gave physical data on chlorine trifluoride and bromine trifluoride, two high energy fuel oxidants.

The Role of Engineering in Nuclear Energy Development; highlights of papers presented at this symposium, Oak Ridge, Tenn., Aug. 27-Sept. 7, 1951:

NUCLEAR REACTORS-The prospect of successful breeding to increase the nuclear fuel supply is a strong incentive for progress in nuclear reactor technology, Dr. Lawrence R. Hafstad, director of the USAEC's reactor program stated. Military demands have shifted reactor development from long-term to short-term objectives, and this continuing military demand for more fissionable materials is making by-product power production more promising, he observed. Even in peacetime, a private power-producing reactor industry is likely to be government-subsidized because of its wartime potential, Dr. Hafstad predicted.

Some of the major objectives in the chemical engineering scale-up for nuclear reactors were listed by Dr. John A. Swartout, assistant research director of Oak Ridge National Laboratory. He described them as operability by remote controls; minimum maintenance; economical operation; and safety.

Concerning reactor control, Dr. John A. Trimmer, professor of physics, University of Tennessee, had this to say: "The twin objectives of reactor control are operation of the reactor to fulfill its function, and adequate protection against the hazards of such operation. The principal danger against which the control system must be designed is that of allowing the reactor to develop an excessively high neutron flux, which would cause overheating of reactor parts, consequent damage to the reactor itself, and subsequent release of dangerous radioactive poisons, Dr. Trimmer stated.

The variety of reactor types complicates engineering problems, explained Neal F. Lansing, Jr., Oak Ridge National Laboratory. Other than the presence of fissionable material, and some method for initiating and controlling the chain reaction, characteristics common to all reactors are not easily found, he declared.

MATERIALS FOR NUCLEAR REACTORS- Dr. George E. Evans, Oak Ridge National Laboratory, summarized materials development in the atomic energy programs in these principal projects--studies of commercially available materials of potential or known reactor usefulness; new metals and alloys which appear promising; liquid metal coolants and cooling systems; refractory metals; and ceramics and metal-ceramics for high temperature use.

In discussing materials for heat transfer, Dr. Richard N. Lyon, Oak Ridge National Laboratory, stated that liquid metals and fused salts are being carefully investigated by heat transfer engineers to determine potential possibilities. However there is still much to be learned about the physical properties of these materials before heat transfer problems in nuclear reactors will be solved, Dr. Lyon observed.

RADIOACTIVE WASTES- Discussing environmental problems of radioactive waste materials, Roy J. Morton, chief chemist, Oak Ridge National Laboratory, warned that development of radioactive waste disposal methods must parallel advances in reactor design if a troublesome bottleneck is to be avoided.

According to W. K. Eister, Oak Ridge National Laboratory, the USAEC and its contractors are now successfully disposing of radioactive wastes without creating hazards to plant people or persons living in surrounding areas. There will be increased volumes of radioactivity, as the number of nuclear reactors in use increases, he noted.

ENGINEERS & NUCLEAR ENERGY- Material development, equipment design, fuel and product processing and control, and safety requirements are major problems encountered in nuclear engineering, according to James A. Lane, principal development engineer, reactor technology division, Oak Ridge National Laboratory. He described typical contributions by the chemical engineer as calculations of neutron flux, fission product buildup in the reactor, and continued improvement of chemical separation processes. The mechanical engineer, said Lane, is concerned with the construction of reactor components and control mechanisms, and the design of such equipment as valves and heat exchangers. Construction of electrical control instruments, and the development of flow instrumentation and high level power supplies, are the special problems of the electrical engineer, while the architectural engineer designs "hot" laboratories, and the civil engineer is concerned with site location and the construction of concrete shielding forms.

ATOMIC PATENT DIGEST...latest U.S. applications & grants...

Patents Granted- Apparatus to count revolutions of a rotating member. A portion of radioactive material is applied to one point of the rotating member, while a detector of radioactivity is mounted adjacent the annular path of movement of the member. A counter, electrically connected to the detector, records each revolution of the rotating member. U. S. Pat. No. 2,566,868, issued Sept. 4, 1951, to Domenico J. Allia, Worcester, Mass.

Chemical analysis using neutrons. Bombarding a fixed fluid cross section of a mixture of carbon-hydrogen compounds with neutrons, determining the intensity of the neutrons emerging from the mixture, and comparing this intensity with a neutron intensity determined by bombarding a fixed fluid cross section of known composition. U. S. Pat. No. 2,567,057, issued Sept. 4, 1951; assigned to The Texas Company, New York, N.Y.

Method of preparing uranium pentafluoride. Comprises reacting a material selected from the group consisting of uranium pentachloride, uranium hexachloride, and mixtures of them, with anhydrous hydrogen fluoride, under certain conditions of temperature and pressure, etc., and then recovering anhydrous uranium pentafluoride. U.S. Pat. No. 2,567,145, issued Sept. 4, 1951; assigned to United States of America (USAEC).

Preparation of beryllium nitride. A process for the preparation of beryllium nitride, comprising heating beryllium metal in contact with a mixture consisting of nitrogen and hydrogen, where the concentration of hydrogen is between 2 and 6 per cent by volume hydrogen. U. S. Pat. No. 2,567,518, issued Sept. 11, 1951; assigned to United States of America (USAEC).

Zirconium and hafnium recovery and purification process. Comprises contacting a colloidal solution of a hydrous oxide of a metal of the group consisting of zirconium and hafnium, with a synthetic organic cation exchange resin, and separating an aqueous solution containing a major amount of these hydrous metal oxides. U. S. Pat. No. 2,567,661, issued Sept. 11, 1951; assigned to United States of America (USAEC).

Patent Applicator- Electrode assemblies. An anode assembly including special supporting structure for use in an electrolytic cell for the manufacture of fluorine by the electrolysis of a fused salt electrolyte. Application No. 601,116, filed June 23, 1945, by assignors to United States of America (USAEC); published Sept. 4, 1951.

Patents Available for Licensing-Now available on a royalty-free, but non-exclusive basis, are the following 19 U.S.-government owned patents, which were developed in the course of USAEC-sponsored nuclear research. Inquiries concerning these, as well as the group previously made available, should be directed to the General Counsel, USAEC, Washington 25, D.C. This latest group comprises: (1) Pumping corrosive mediums. U. S. Pat. No. 2,502,074. (2) Producing pure ductile vanadium from its oxide. U. S. Pat. No. 2,561,526. (3) Preparing uranium bromide. U. S. Pat. 2,562,122. (4) Electrical contact for electrolytic cells. U. S. Pat. No. 2,562,150. (5) Vacuum distillation. U. S. Pat. No. 2,562,153. (6) Producing xylene hexafluoride. U. S. Pat. No. 2,562,159. (7) Position indicating control apparatus. U. S. Pat. No. 2,562,637. (8) Electrical scaling circuit. U. S. Pat. No. 2,562,645. (9) Method of mitigating radioactive contamination. U. S. Pat. No. 2,563,587. (10) Ion source. U. S. Pat. No. 2,563,628. (11) Shielded container. U. S. Pat. No. 2,563,718. (12) Controlling the boundaries between electrolytic fluids. U. S. Pat. No. 2,563,729. (13) Method of making halocarbon polymers. U. S. Pat. No. 2,564,024. (14) Extraction process for cerium. U. S. Pat. No. 2,564,241. (15) Measuring device and method of measuring. U. S. Pat. No. 2,564,626. (16) Photochemical chlorination of hydrocarbons. U. S. Pat. No. 2,566,052. (17) Process for photochemical chlorination of hydrocarbons. U. S. Pat. No. 2,566,065. (18) Zirconium and hafnium separation process. U. S. Pat. No. 2,566,665. (19) Segmented ionization chamber. U. S. Pat. No. 2,566,684.

RADIOISOTOPES & IONIZING RADIATION...applications & notes...

Wool Research- Radioactive isotopes are being used by the Wool Industries Research Association, Torridon, Leeds (England), for investigating the structure of the wool substance keratin; in experiments into the physical chemistry of dyeing processes; and in investigating the consumption of synthetic detergents. The radioisotopes are obtained from the nuclear reactors at the Atomic Energy Research Establishment, Harwell. Radiocopper is being used to assist in the investigation of the constitution of the complicated long chain molecules which comprise the molecule of keratin. The long chains of the keratin molecule are first broken down by hydrolysis, after which the resultant constituents (amino acids) are separated by chromatography. Quantitative measurements are then obtained by combining the amino acids with radiocopper, the activities of the various acid-copper complexes thus formed being determined with a Geiger counter. Radiobromine and radiosodium are being used as tracers in experiments to gain some insight into the physical chemistry of the dyeing processes. In this case, the tracer enables a determination to be made of the rate at which a dye solution is being absorbed by wool. Radiosodium is being used in connection with experiments concerned with the consumption of synthetic detergents used in the scouring of wool. Radiosodium was incorporated in the detergent, its radioactivity being used to determine the distribution of the detergent between the wool fibres, grease, and scouring liquor.

Radiation- A survey of 4,000 radiologists in the United States will be conducted by the U. S. Public Health Service to determine the prevalence of congenital malformations among those who are constantly exposed to radiation through work with X-ray or radium therapy. The USPHS believes this is the first attempt to determine whether radiation causes important hereditary changes in a human population within a period of one or two generations. Dr. Stanley H. Macht, Washington County Hospital, Hagerstown, Md., will conduct the study. The results will supplement other studies, such as those of the Atomic Bomb Casualty Commission, in indicating the type of casualty which could result from atomic warfare. The direct result of this survey will, of course, show whether current protective measures for workers in radiological laboratories are adequate.

RAW MATERIALS...radioactive minerals & other needs for nuclear work...

UNITED STATES-Moab, Utah: A large group of uranium claims in the area between the Colorado and Green rivers has been taken over by F. A. Sitton, Dove Creek, Colo. Sitton has said that he and his associates will start development work on the properties shortly. Ore outcroppings in Mineral canyon and Oil basin will be opened up and surveyed, to determine the extent of available tonnage. Aztec, N.M.: The property of the Blue Peak Mining Co. is giving all indications of a good uranium strike, here in the Grants territory. The first two truck loads of the rock sent to a local mill for analysis were more than satisfactory, so far as uranium oxide content was concerned, the Blue Peak owners have stated:

CANADA- A contract for diamond drilling on its Walberg holdings, adjoining on the east Eldorado's Eagle mine in the Athabaska area, Northern Saskatchewan, has now been signed by Baska Uranium Mines. The first holes will go down on what are known as the Nos. 7 and 9 showings, the most promising of several uranium discoveries made last year, according to Dr. G. C. McCartney, consulting geologist.

Several groups of claims in the Charlebois Lake sections of Saskatchewan, 150 miles east of Goldfields, have been staked and recorded by Uranium Explorations, Ltd., it is reported by Austin Johnston, manager-engineer of that company. These claims adjoin properties now being drilled by Charlebois Lake Uranium and Consolidated Mining and Smelting, Johnson states. Uranium Explorations has also staked and recorded other groups in the Rapids Area of Higginson Lake, where Cons. M. & S. also has ground. Also active in the Charlebois Lake district is Dee Explorations, whose holdings are at Spreckly Lake, adjoining Charlebois Lake to the north.

Sincerely,

The Staff,  
ATOMIC ENERGY NEWSLETTER